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Indian Standard

SHIP BUILDING — DECK MACHINERY — GENERAL REQUIREMENTS

भारतीय मानक

जहाज की डेक मशीनरी — सामान्य अपेक्षाएं

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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 23 May 1989, after the draft finalized by the Marine Engineering Sectional Committee had been approved by the Transport Engineering Division Council.

Ship's deck machinery has an extensive and varied range and can be classified as follows :

a) Anchor handling (windlasses and capstans) ;

b) Mooring (winches and capstans) ; and

c) Cargo handling (winches and cranes).

The basic requirements of all these is to control loads associated with chain cables or wire ropes and while each type of equipment has its own operational requirement, certain aspects of design and operation are common.

Most of the deck machinery is idle during much of its life span and due to this intermittent duty requirement, gears and drives are normally designed to a limited rating of half an hour to one hour. It is to be kept in mind that this equipment is subjected to heavy stresses due to handling by dock labour in different ports of the world and is also exposed to highly corrosive saline atmosphere. Despite long periods of idleness, often in severe weather conditions, the machinery must operate immediately when required.

It is proposed to cover in this standard general requirements which are common for all types of deck machinery. Other detailed requirements peculiar to each type of deck machinery are covered in the following Indian Standards :

IS 5112 : 1972	General requirements and testing of ac cargo winches (for shipboard use) (*first revision*)
IS 5113 : 1979	General requirements and testing of ac mooring winches (for shipboard use) (*first revision*)
IS 7937 : 1981	General requirements and testing of windlasses (*first revision*)
IS 8993 : 1978	General requirements and testing of topping winches
IS 8994 : 1978	General requirements and testing of accommodation ladder winches
IS 9067 : 1979	General requirements and testing of lifeboat winches

In the preparation of this standard assistance has been derived from ISO 7825 : 1985 Shipbuilding — Deck machinery — General requirements.

Attention of the manufacturers and the users of the equipment is also drawn to the provisions of Chapter VIII 'Loading and unloading machinery and gear of safety of health in deck work', issued by the International Labour Organization (ILO).

Indian Standard

SHIP BUILDING — DECK MACHINERY — GENERAL REQUIREMENTS

1 SCOPE

1.1 This standard specifies the general requirements common to all deck machinery of any type, not detailed in the relevant Indian Standards.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard :

IS No.	*Title*
IS 823 : 1964	Code of procedure for manual metal arc welding of mild steel
IS 4009 (Part 1) : 1981	Grease nipples : Part 1 Button head grease nipples (*first revision*)
IS 4009 (Part 2) : 1981	Grease nipples : Part 2 Conical head grease nipples (*first revision*)
IS 4691 : 1968	Degrees of protection provided by enclosures for rotating electrical machinery
IS 5130 : 1969	Drums fitted to cargo and mooring winches
IS 8650 : 1977	Glossary of terms and graphical symbols for ships' deck machinery

3 TERMINOLOGY

3.1 For the purpose of this standard the terms and definitions given in IS 8650 : 1977, shall apply.

4 GENERAL REQUIREMENTS

4.1 Warping Ends

Cargo, mooring, and towing winches may be designed with or without warping ends. When the warping ends are specified it shall be necessary to state:

a) whether one or two warping ends are required;

b) when only one warping end is required, at which end, it is to be placed; and

c) whether, or not, the drum is required to be declutchable (in case of cargo winches).

4.2 Material Stresses

The manufactures of the deck machinery shall be responsible for determining the strength requirements of all the component parts regarding the stresses to which they are commonly subjected and according to the service for which they are intended, provided the deck machinery is used under the conditions agreed in the contract.

4.3 Drum Design

4.3.1 *Drum Diameter*

The drum diameter for mooring, cargo handling and topping winches shall conform to IS 5130 : 1969.

4.3.2 *Drum Capacity*

Drum capacity shall be sufficient to accommodate the complete length of the rope to be reeled evenly on the drum.

4.3.3 *Drum Size*

The drum size shall be chosen as per IS 5130 : 1969, depending upon the load to be handled.

4.3.4 *Drum Flange Height*

The drum flange height shall be such that the flange exceeds the top layer of the cable by 2 times the cable diameter for steel cables and 1.5 for synthetic ropes.

4.4 Control Methods and Movements

4.4.1 *Methods of Control*

The methods of control shall be either manual, automatic or remote. A combination of the terms may be used to describe control methods, for example, manual/remote.

4.4.1.1 *Manual control*

Where the machinery is directly controlled by an operator and there is no facility for automatic control.

4.4.1.2. *Automatic control*

Where the machinery is controlled, within selectable limits, without direct human intervention.

4.4.1.3 *Remote control*

Where the winch is directly controlled from a position not integral with the machine (for example : by radio, electric, pneumatic or hydraulic link). The control position may be fixed or portable.

4.4.2 *Direction of Motion of the Operating Devices*

4.4.2.1 The direction of motion of the operating devices shall be such that the machinery shall haul in by clockwise movement of a handwheel or crank handle or, alternatively, by movement of a hand lever towards the operator or to the right or downwards.

4.4.2.2 Whatever the form of motive power, the operating device shall, when under manual control, be arranged to return to the braking position automatically unless otherwise specified by the purchaser.

4.4.2.3 All control handles, handwheels and push buttons shall be clearly and permanently marked with their purpose and mode of operation unless these are obvious from their design and position.

4.4.2.4 If required, instructions shall be permanently marked in a readily visible position.

4.4.2.5 The direction of rotation when hauling in shall be clearly and permanently marked on drums.

4.4.3 *Handwheels*

A clockwise movement shall cause the deck machinery to haul in, an anticlockwise movement shall cause the machinery to pay out.

4.4.3.1 Applied to a braking system, a clockwise movement shall apply the brake, an anticlock wise movement shall release it.

4.4.3.2 The manual effort for the operator shall not exceed 250 N for speed regulation and 500 N at any moment.

4.4.4 *Levers*

4.4.4.1 The maximum travel of a lever shall not exceed 600 mm in one direction, or 300 mm to either side from central position, if movable in both the directions.

4.4.4.2 Those having a side to side movement, shall cause the machinery to haul in when the lever is moved to the right and to pay out when moved to the left.

Applied to a braking system, the movement to the right shall apply the brake and movement to the left shall release it.

4.4.4.3 Levers having a backward-forward movement shall cause the machinery to haul in when the handle is moved towards the operator and to pay out when moved away from the operator.

Applied to a braking system, the movement towards the operator shall apply the brake and movement away from the operator shall release it.

4.4.4.4 Levers having movement in the vertical direction shall cause the machinery to haul in when depressed and to pay out when raised.

Applied to a braking system, the upward movement shall apply the brake and downward movement shall release it.

4.4.4.5 Levers shall be fitted in accessible, readily visible positions so as to ensure complete operational safety.

4.4.4.6 They shall be constructed and placed in such a way that they can be operated and read unmistakably. Moreover, they shall be protected against unintentional operation.

4.4.4.7 The manual effort on the brake for the operator shall not exceed 160 N.

4.4.5 *Foot Pedals*

Foot pedal operated brakes shall be applied when the pedal is depresssed and released when it is raised. The maximum travel of the pedal shall not exceed 250 mm. The physical effort for the operation shall not exceed 320 N.

4.4 6 *Push Buttons*

4.4.6.1 When fitted, and when they are not associated with automatic sequential control, separate push buttons shall be provided for each direction of operation for example one push button to haul in and a separate button to veer.

4.4.6.2 The buttons shall be depressed to actuate the machinery and when released shall cause the machinery to be stopped and effectively braked.

4.4.6.3 Where advisable, the above mentioned push-buttons may be replaced by 'start' and 'stop' push buttons.

4.4.7 *Gear Levers*

When fitted, gear levers shall be positively engaged in any gear position or neutral by click stops or other similar means.

4.5 Construction

Good workmanship and adequate materials are essential requirements for compliance with this standard.

4.5.1 *Materials*

The materials used for the construction of the deck machinery shall be in accordance with the appropriate Indian Standards selected to ensure stresses not exceeding those specified for the materials.

4.5.2 *Welding*

All welding shall be carried out in accordance with IS 823 : 1964.

4.5.3 *Access*

Access openings to prime movers, reduction gearing, bearing, brakes and control mechanisms shall be provided to ensure that adequate inspection and maintenance are facilitated. The inspection cover shall be painted with 'inspection cover'.

4.5.4 *Lubrication*

The deck-machinery shall be designed to ensure that all bearing surfaces are lubricated during operation when inclined at an angle up to 15° in any direction.

4.5.4.1 Adequate and accessible manual lubrication points shall be provided both for oil and grease, to ensure that all required surfaces are correctly lubricated.

4.5.4.2 Lubricating nipples shall be in accordance with IS 4009 (Part 1 and 2) : 1981. Nipples shall be fitted so as not to be damaged by mechanical shocks and chafing and protected against dirt and/or upsetting of paint. Moreover, the nipples shall always be easily accessible.

4.5.4.3 Sumps and oil baths shall be provided with protective type of sight glasses or means of measuring oil level.

4.5.4.4 Gear boxes shall be provided with easily accessible means for oil level checking and drainage plugs.

4.5.5 *Electrical Equipment*

The electrical equipment shall be installed in accordance with the related regulations on the subject.

4.5.5.1 The requirements of the following Indian Standards shall be complied with :

a) IS 2026 (Parts 1 to 4) Power transformers

b) IS 4722 : 1968 Rotating electrical machines

c) IS 6380 : 1971 Elastomeric insulation and sheath of electric cables

4.5.5.2 Deck mounted encloures of electrical equipment shall be watertight. Enclosures of portable electrical equipment shall be weatherproof as per IS 4691 : 1968.

4.5.5.3 Electrical cables and all electrical equipment exposed to shocks and chafing by ropes or cargo shall be protected by pipes or other means.

4.5.6 *Safety Protection*

Adequate protection shall be provided for all external gears and all moving surfaces.

4.5.6.1 Suitable protection shall be provided for preventing persons from coming into contact with surfaces having temperatures over 50°C. This temperature limit is not applicable for hydraulic systems.

4.5.7 *Protection & Metallic Surfaces*

Surfaces shall be free from moisture, oil, grease, dirt, weld-spatter, burrs and other imperfections before the protective finish is applied to metallic surfaces.

4.5.7.1 External surfaces and internal surfaces shall be primed with anti-corrosive priming, paint, adequate to provide protection against a marine environment, as soon as practicable after completion of the surface preparation.

4.5.7.2 Internal surfaces of gear boxes shall be coated with an oil proof paint.

4.5.7.3 All steel surfaces not protected by lubricant or coating of any other type shall be sandblasted to near white metal and painted with one coat of zinc-rich epoxy paint, of a type and a thickness to be agreed upon between the manufacturer and the purchaser.

4.5.8 *Environmental Condition*

Deck machinery shall be designed for correct operation of its components at temperature between − 20° and + 60°C.

NOTE — Greater extremes of temperatures for continuous service may be indicated by the customer at the time of enquiry.

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